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ABSTRACT

This document presents a programmed introduction to concepts of affective behavior according to the taxonomic analysis developed by Krathwohl for college education students. The main task the student is expected to perform upon completion of the program is to identify affective behaviors in each of Krathwohl's five levels. Nine subtasks are identified as composites of the major program task. Successful completion of the task is validated by the student's ability to identify with 80 percent accuracy the appropriate level in Krathwohl's taxonomy of a set of affective behaviors without reference to other materials. A pretest and posttest (and answer sheets) are included with the program. A tabular representation of the pre- and post-test scores of seventy-eight students who had taken the program and an analysis of these figures are included in a validation of the program's efficacy in producing knowledge level gains in the understanding of Krathwohl's taxonomy of affective behavior. (MJB)

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A PROGRAMMED INTRODUCTION
TO
THE AFFECTIVE DOMAIN

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Task Analysis

Main Task

The students will identify affective behaviors in each of Krathwohl's five levels.

Subtasks

1. The student will write the basic tenet of taxonomic analysis that all educational objectives can be identified as either cognitive, affective, or psychomotor.
2. The student will identify cognitive behavior.
 - a) The student will state that cognitive learning refers to knowledge, facts, and intellectual responses.
3. The student will identify psychomotor behavior.
 - a) The students will state that psychomotor behavior refers to motor skills.
4. The student will identify affective behavior.
 - a) The student will state that affective learning refers to attitudes, emotions, and values and can be arranged in a hierarchy.
5. The students will identify affective behaviors at the receiving level.
 - a) The students will identify affective behaviors at the receiving level with simple awareness of a stimulus.
6. The student will identify affective behaviors at the responding level.
 - a) The student will identify affective behaviors at the responding level with interacting with the stimulus.
7. The student will identify affective behavior at the valuing level.
 - a) The student will identify affective behavior at the valuing level with placing a judgment on a stimulus.
8. The student will identify affective behavior at the organization level.
 - a) The student will identify affective behavior at the organization level with comparing one value with another.
9. The students will identify affective behavior at the characterization level.
 - a) The students will identify affective behavior at the characterization level with internalization of a particular value preference.

Objectives, Subobjectives, Entry BehaviorGeneral Objective

Given a set of affective behaviors, the student will correctly identify 80% of the behaviors with the appropriate level in Krathwohl's affective taxonomy. He may not use any reference material.

Subobjectives

1. The student will write that all educational objectives can be defined as either cognitive, psychomotor, or affective. All three must be in the response.
2. Given a set of behaviors, the learners will correctly identify the cognitive behavior 100% of the time.
 - a) Given a set of terms, the student will choose the three that refer to a cognitive behavior. (facts, knowledge, intellectual behavior)
3. Given a set of behaviors, the student will correctly identify the psychomotor behavior with 100% efficiency.
 - a) Given a set of terms, the student will choose the one that defines psychomotor behavior as referring to skills.
4. Given a set of behaviors, the student will correctly identify the affective behavior with 100% efficiency.
 - a) Given a set of terms, the student will choose the three that refer to affective behavior, (attitudes, values, emotions) and will complete a sentence to indicate these are arranged in a hierarchy in a function of intensity. The definition must include both of the above aspects.
5. Given a set of behaviors, the student will identify affective behaviors at the receiving level with 90% accuracy.
 - a) The student will describe affective behavior at the receiving level as awareness of a stimulus.
6. Given a set of behaviors, the student will correctly identify affective behavior at the responding level with 90% accuracy.
 - a) The student will choose the option "interacts with" to describe affective behavior at the responding level.
7. Given a set of behaviors, the student will correctly identify affective behaviors at the valuing level with 90% efficiency.
 - a) The student will describe affective behaviors at the valuing level as placing a judgment on a stimulus.
8. Given a set of behaviors, the student will correctly identify affective behaviors at the organizing level with 90% efficiency.
 - a) The student will describe affective behaviors at the organizing level as comparing and organizing.

9. Given a set of behaviors, the student will correctly identify affective behaviors at the characterization level with 90% efficiency.
 - a) The student will describe affective behavior at the characterization level as the internalization of particular value so that consistent behavior results.

ENTRY BEHAVIOR

1. The student will be able to read.

PRETEST

Page 2.

12. Willingness to comply with health regulations
 Willingness to face facts and conclusions that can logically be
drawn from them is an example of affective behavior at the
responding level.
13. The organization level of the affective domain is involved with
() comparing and organizing
() understanding and using
() liking and justifying
14. Considers the importance of being honest
Develops a consistent philosophy of life
Which of the above is an example of affective behavior at the
characterization level of the taxonomy?
15. Match the following affective behaviors with the proper taxonomic
level:
- | | |
|--------------------------------|---|
| <u> </u> organizing | A Recognition that there may be more than one |
| <u> </u> responding | acceptable point of view. |
| <u> </u> valuing | B Judge people of various races, cultures, national |
| <u> </u> receiving | origins, and occupations in terms of their |
| <u> </u> characterization | behaviors as individuals. |
| | C Completes his homework. |
| | D Acceptance of the place of worship in man's |
| | life. |
| | E Acceptance of objectivity and systematic |
| | planning as basic methods in arriving at satis- |
| | fying choices. |
16. Indicate which of the following is an example of affective behavior
at the receiving level.
 awareness of Beethoven
 always eats chocolate ice cream when he gets a choice.
17. Which of the following is an illustration of affective behavior at
the organizing level?
 attempts to identify characteristics of an art object he admires
 enjoys reading books on a variety of themes.
18. When a person places a judgment on a behavior, he is operating
at the level in the affective domain.

1.
This is a programme designed to introduce you to a major category of behavior. Study each frame and respond in the space provided. Check your response with the answer given in the confirmation section. Then proceed to the next frame if you had the correct response. If not, study the frame again before proceeding.

2.
Everything a person does can be described as falling into three broad behavioral domains.

There are _____ broad behavioral domains.

3.
All behavior can be divided into three domains-
COGNITIVE, AFFECTIVE PSYCHOMOTOR.

One behavior is COG - - - - -.

One behavior is AFF - - - - -.

One behavior is PSY - - - - -.

4.*
All human activities can be described as belonging to one of three behavioral domains.

5.
These are cognitive behaviors.
A fact (Canada is the largest country in North America)
Knowledge that a person might possess (The names of the Prime Ministers of Canada)
An intellectual behavior such as solving a math problem.

These are not cognitive behaviors.
An emotion such as fear.
A motor skill such as running.
An attitude (tolerance)
A value - I like ice cream.

Which of the following statements are true about cognitive behavior?
Stating a fact is an example of cognitive behavior ()
A person involved in intellectual activity is involved in cognitive behavior ()
Knowledge is a cognitive behavior ()

6.
Facts, knowledge, and intellectual behavior are referred to as cognitive behaviors.

The three cognitive behaviors are

7.*

Indicate which of the following are cognitive in nature.

☐ facts	☐ knowledge
☐ motor skills	☐ intellectual behavior
☐ attitudes	☐ emotions
☐ values	

8.

These are examples of cognitive behavior:

$$2 \times 2 = 4$$

Canada is the largest country in North America.
counting from 1 to 10

These are not examples of cognitive behavior

laughing
doing a forward roll
being frightened
love

Which of the following statements are true about cognitive behavior?

a fact is a cognitive behavior ()
An intellectual behavior is cognitive ()
Knowledge is a cognitive behavior ()

9.

Which of the following is a cognitive behavior?

doing math problems _____
playing basketball _____
listening to music _____

10.

This is a psychomotor behavior-

A motor skill such as running or playing football.

These are not psychomotor behaviors-

An emotion such as fear
An attitude such as tolerance
a value - I like ice cream.

Indicate if the following statement is true or false:

A psychomotor behavior refers to a motor skill ()

11.*

Indicate the correct response.

☐ Psychomotor skills refer to facts, knowledge, or intellectual behavior
such as memorizing, or doing a physics question.
☐ Psychomotor behavior refers to skills such as writing, swimming, or
playing.

12.

These are examples of psychomotor skills-
playing basketball, singing, dancing, climbing doing a forward roll.

These are not examples of psychomotor behavior-
crying, fear, the names of the members of the Toronto Maple Leafs, Mary
likes Joe, the capital of Ontario is Toronto.

Indicate whether the following statement is true or false;

A psychomotor activity refers to a motor skill such as playing or standing
on your head. ()

13.*

Which of the following is a psychomotor behavior?

- reciting a poem ()
- having an interest in flowers ()
- walking down the street ()

14.

These are affective behaviors:

- an emotion such as fear
- an attitude such as tolerance
- a value - I like ice cream

These are not affective behaviors:

- a fact (Canada is the largest country in North America)
- Knowledge that a person may possess (The names of the Prime Ministers
of Canada)
- An intellectual behavior such as reciting a poem
- A motor skill such as running.

Which of the following statements are true about affective behaviors?

- An attitude such as kindness is an affective behavior ()
- a value such as I love you is an affective behavior ()
- An emotion such as fear is an affective behavior ()

15

Attitudes, values, and emotions are affective behaviors.

The three affective behaviors are:

16.

A HIERARCHY is defined as an arrangement of objects or values in a
graduated series.

These are examples of a hierarchy:

- 1,2,3,4,5
- private, corporal, sergeant
- good, better, best

Affective behaviors are arranged in a hierarchy from simple values, attitudes,
or emotions to intense values, attitudes, or emotions.

Affective behaviors are arranged systematically in a _____.

17.*

Indicate which of the following behaviors is (are) affective in nature.

☐ facts	☐ knowledge
☐ motor skills	☐ intellectual behaviors
☐ attitudes	☐ emotions
☐ values	

Affective behaviors can be arranged in a _____ to indicate the intensity of the behavior.

18.

These are examples of affective behaviors:

crying, fear, Mary likes Joe.

These are not examples of affective behavior:

The capital of Ontario is Toronto, the names of the players on the Toronto Maple Leafs, playing hopscotch.

Indicate whether the following statements are true or false.

An affective activity refers to an attitude - tolerance ()

An affective behavior refers to an emotion - anger ()

An affective behavior refers to a value such as "I like it" ()

19.*

Which of the following is an affective behavior?

adding 2 and 2 _____

accepting responsibility _____

eating _____

You have now been introduced to a classification of educational goals designed by Bloom, Krathwohl, and Masia. This programme will concentrate on the affective domain.

When a manufacturer wishes to sell you a product, he must first of all make you aware of the existence of the product. He usually does this through advertising. To get you to pay attention to his commercial advertisement, he uses many devices - beautiful women, vivid colours, slogans, jingles, famous personalities, etc. These are all professionally calculated to capture your awareness, to get you to read the ad, to get you to sit through the T.V. commercial, to get you to receive the message of the product.

The purpose of advertising is to make you AW- - - of the existence of a specific product.

21.

The lowest level of the affective hierarchy is similar to the first step in retailing. When a person is first aware of a value, or first realizes there is chocolate ice cream or first is introduced to Beethoven, he is operating at this level.

This first level is called the RECEIVING level.

The first level in the affective hierarchy is the _____ level.

22.*

When a person is conscious of a particular stimulus, he is said to be operating at the _____ level of the affective domain.

23.

These are affective: receiving behaviors:

- 1) Awareness of the feelings of others
- 2) Listens to the music of Beethoven
- 3) Realizes the importance of a good breakfast

These are not affective: receiving behaviors:

- 4) Explains why he always eats corn flakes for breakfast
- 5) Can distinguish between Brahms and Beethoven
- 6) Always tries to help the less fortunate

While all six deal with attitudes, the first three are initial introductions to a particular behavior, while 4,5,6 clearly represent more consistent advanced behavior.

When a person first realizes an attitude, value, or emotion, he is said to be operating at the AFFECTIVE: _____ level.

24.*

Which of the following is an example of affective behavior at the receiving level?

- _____ Attempts to identify the characteristics of an art object he admires
- _____ Listens to others.

25.

Now that our consumer is aware of our product, the next step is to get him to try it. Another way of stating this is to get him to respond to the advertisement by buying the product. This is the sampling stage and may last for a long time. You may have to buy several cases of a soft drink before you can come to any conclusion about it.

The second level in the affective hierarchy describes a behavior much the same as this. When you are trying something new like Beethoven, poetry, kindness, or charity, and still have not made up your mind about it, you are said to be RESPONDING.

The second level of the affective hierarchy is the _____ level.

26.*

At the responding level of the affective taxonomy, a person

- () ignores
- () interacts with a stimulus
- () loves

27.

These are examples of AFFECTIVE:RESPONDING behaviors

- 1) Practices the rules of safety
- 2) Voluntarily reads magazines.
- 3) Tries another bottle of Canada Dry.

These are not examples of AFFECTIVE: RESPONDING behaviors:

- 4) Always preaches the rules of safety to children
- 5) encourages his friends to read Time
- 6) Only serves Canada Dry at his house

These six behaviors are all affective. 1,2,3 show the subject interacting in some way with a stimulus. 4,5,6 clearly indicate that the subject has made up his mind about these values. He is more advanced in the affective hierarchy.

When a person gets involved in some way with a new attitude, he is said to be operating at the _____ level of the affective domain.

28.*

Which of the following is an example of affective behavior at the RESPONDING LEVEL?

- Obeys playground rules
 Has the habit of approaching life objectively

29.

Having now tried the product a number of times, the consumer is prepared to make some form of value judgment about it - "I like it" is the hoped for response, although some times the opposite reaction happens. This valuing process is similar to the behavior in the third level of the affective domain - you are said to be VALUING.

The third level of the affective domain is the _____ level.

30.*

The valuing level of the affective domain describes a person as _____ a stimulus.

31.

These are examples of affective behavior at the valuing level:

- 1) Increased appetite and tastes for what is good in literature
- 2) A desire for democratic relations between husband and wife
- 3) Writes letters to the press on issues he feels strongly about

These are not affective: valuing behaviors:

- 4) Recognition that there may be more than one acceptable point of view
- 5) Develops awareness of aesthetic factors in dress
- 6) Sensitivity to social situations that are urgent

The above six behaviors are all affective. 1,2,3 indicate that the subject had taken a stance, judged, or valued. They all indicate that the behavior is becoming part of the learner. 4,5,6 on the other hand are illustrates simple awareness.

When a person is familiar enough with an object, condition, person, etc. to make a judgement about it, he is said to be operating at the _____ level of the affective domain.

32.*

Which of the following is an example of affective behavior at the valuing level?

- Devotion to democracy
 Readiness to revise his behavior.

33.

Even though our consumer now thinks the product is good and he probably buys it regularly, the producer cannot sit back and assume that will always be the case. There are always similar products, new commercials vieing for our consumer's dollars. Indeed before the habit of buying product "A" becomes part of his behavior repertoire, it must be formally challenged by a competitor. The process of challenging, or comparing is similar to the fourth level of the affective domain. When your values are challenged and you compare the options and organize them into a hierarchy you are said to be functioning at the ORGANIZING level of the affective domain.

The fourth level of the affective domain is the _____ level.

34.*

The organization level of the affective domain is involved with

- () Using and developing
- () Comparing and organizing
- () Liking and using

35.

These are examples of affective behaviors at the organization level:

- 1) Attempts to identify characteristics of an art object he admires
- 2) Weighs alternative social policies and practices
- 3) Develops a plan for regulating his rest in accordance with the demands of his activities

These are not affective behaviors at the organization level:

- 4) Acquaints himself with significant current issues
- 5) Willingness to comply with health regulations
- 6) Obeys the playground rules

All these behaviors are affective. 1,2,3 illustrate a comparing action, the end result of which will be organizing one's priorities. 4,5,6 involve more simple affective behaviors (responding).

When a person is comparing his value judgment with alternatives, and organizing his values into hierarchies, he is said to be operating at the _____ level of the affective taxonomy.

36.*

- () Finds pleasure in listening to good music
- () Judges people of various races on terms of their behaviors as individuals.

is an example of organizing affective behavior.

37.

Our mythical consumer has now decided that product "A" is for him. It has withstood the challenge of the organization level and has now become a part of him. Whenever he goes to the store he automatically reaches for product "A" without even seriously considering alternatives. Behavior of this sort is similar to affective behavior at the CHARACTERIZATION level, so called because the value has indeed become part of one's character, a consistent value judgment.

The most sophisticated level of affective behavior is called _____.

38.*

A _____ value preference is formed at the characterization level of the affective taxonomy through internalizing a particular value so that it becomes a part of his behavior pattern.

39.

These are affective behaviors at the characterization level:

- 1) Develops a consistent philosophy of life
- 2) Confidence in his talent as a speaker
- 3) Acceptance of objectivity as the basic method of arriving at satisfying choices

These are not affective behaviors at the characterization level:

- 4) Interests himself in social problems
- 5) Reads widely so as to extend and enrich experience
- 6) Voluntarily reads about the life of great artists

All of these behaviors are affective. 1,2,3 demonstrate a definition of an aspect of a person's character, 4,5,6 are affective behaviors at the responding level.

When a person internalizes a value so that it becomes a consistent part of his value system he is said to be operating at the _____ level.

40.*

Which of the following is the best example of affective behavior at the characterization level?

- _____ Cooperates in the production of a school paper
 _____ Confidence in his ability to succeed

41.*

Match the following affective behaviors with the proper level in the taxonomy:

- | | |
|------------------------|--|
| _____ Receiving | A. Observes the traffic rules |
| _____ Characterization | B. Continuing desire to develop the ability to speak and write effectively |
| _____ Organizing | C. Awareness of the feelings of others |
| _____ Responding | D. Confidence in his ability to succeed |
| _____ Valuing | E. Weighs alternative social policies |

- 1.
2. Three
3. Cognitive, Affective, Psychomotor
4. Cognitive, Affective, Psychomotor
5. All three are true
6. Fact, Intellectual behavior, Knowledge
7. Fact, Knowledge, Intellectual behavior
8. They all are
9. Doing mathematics problems
10. True
11. Psychomotor skills refer to skills such as writing, swimming, or playing
12. True
13. Walking down the street
14. All are true
15. Attitudes, Values, Emotions
16. Hierarchy
17. Attitudes, Values, Emotions, Hierarchy
18. All are true
19. Accepts responsibility
20. Aware
21. Receiving
22. Receiving
23. Receiving
24. Listens to other
25. Responding
26. Interacts with
27. Responding
28. Obeys playground rules
29. Valuing
30. Valuing or judging
31. Valuing
32. Devotion to democracy
33. Organizing (organization)
34. Comparing and organizing
35. Organizing, or organization
36. Judges people of various races in terms of their behavior as individuals
37. Characterization
38. Consistent
39. Characterization
40. Confidence in his ability to succeed
41. C) Receiving
D) Characterization
E) Organizing
A) Responding
B) Valuing

1. All human activities can be described as belonging to one of three behavior domains: _____

2. Which of the following is a cognitive behavior?
 (a) doing a forward roll _____
 (b) answering a question in science _____
 (c) liking chocolate ice cream _____
3. Which of the following is a psychomotor behavior?
 (a) enjoying an ice cream cone _____
 (b) doing a forward roll _____
 (c) reconstructing orally the voyage of Columbus _____
4. Which of the following is an affective behavior?
 (a) multiplying 3 times 4 _____
 (b) co-operates with his mother _____
 (c) jumping over a fence _____
5. At the responding level of the affective taxonomy, behavior is characterized by:
 (a) interaction
 (b) rejection
 (c) admiration
6. Voluntarily participates in the music festival _____
 Changes his mind _____ Which of these is an example of affective behavior at the valuing level of the taxonomy?
7. The characterization level of the affective taxonomy involves the establishing by the individual of a _____ value system through internalization of particular values.
8. Match the following affective behaviors with the proper taxonomic level.
 _____ receiving A increased appetite and taste for what is good
 _____ organizing in literature.
 _____ responding B attempts to identify characteristics of an
 _____ valuing art object he admires.
 _____ characterization C Develops a consistent philosophy of life.
 D Develops an awareness of aesthetic factors
 in dress.
 E Visits the museum when told to.
9. _____ Relies on the method of science to find answers to questions about the physical world and about society.
 _____ Plays number games for fun. is an example of
 characterization affective behavior.
10. The organization level of the affective domain is involved with
 () justifying and using
 () comparing and organizing
 () liking and developing

POSTTEST

11. _____ expresses himself in music.
 _____ views problems in objective, realistic, and tolerant terms is an
 _____ example of affective behavior at the responding level of the taxonomy.

12. The receiving level of the affective domain describes a person as
 being _____ of a stimulus.

13. _____ emotions _____ motor skills
 _____ facts _____ knowledge
 _____ attitudes _____ intellectual behavior
 _____ values

Check which of the above are affective behaviors.

To distinguish minor affective behaviors from intense ones, the actions
 can be arranged in a _____.

14. Indicate the correct response:
 _____ psychomotor behaviors refer to knowledge much as knowing the date
 that the Vikings discovered North America.
 _____ psychomotor behaviors refer to skills such as peeling an orange.

15. _____ emotions _____ motor skills
 _____ facts _____ knowledge
 _____ attitudes _____ intellectual behavior
 _____ values

Check which of the above are cognitive.

16. Which of the following is an example of affective behavior at the
 receiving level?
 _____ develops some consciousness of colour, form, and design in objects
 _____ grows in his sense of kinship with all humans

17. _____ is synonymous with the behavior at the valuing level of the
 affective domain.

18. Weighs alternative social policies _____
 Reads widely so as to extend his experience _____
 Which of the above is an example of affective behavior at the organizing
 level of the affective taxonomy?

PRETEST

1. cognitive
affective
psychomotor
2. doing mathematics problems
3. writing the letter "f"
4. Accepts responsibility
5. interacting
6. assumes responsibility
7. consistent
8. knowledge
facts
intellectual behavior
9. psychomotor skills refer to
skills such as swimming
10. emotions
attitudes hierarchy
values
11. receiving
12. willingness to comply with
health regulations
13. comparing and organizing
14. develops a consistent
philosophy of life
15. B organizing
C responding
D valuing
A receiving
E characterization
16. Awareness of Beethoven
17. enjoys reading books...
18. valuing

POSTTEST

1. cognitive
affective
psychomotor
2. answering a question in science
3. doing a forward roll
4. co-operates with his mother
5. interaction
6. voluntarily participates in the
music festival
7. consistent
8. D receiving
B organizing
E responding
A valuing C characterization
9. relies on the method of science
10. comparing and organizing
11. expresses himself in music
12. aware
13. emotions
attitudes hierarchy
values
14. psychomotor behaviors refer to
skills such as peeling an orange
15. facts
knowledge
intellectual behavior
16. develops some consciousness of
colour, ...
17. judging
18. weighs alternative social policies

VALIDATION REPORT

An analysis of Tables I, II and III suggest the following conclusions:

- 1) there appears to be positive growth as a result of the programme
- 2) no student in group 1 received a lower score on the post test
- 3) the per cent change in group 1 is +27%; group 2 - +4.8%. The significant difference can be attributed to the programme
- 4) Comparison of post test scores of group 2 (mean 18.6) and group 3 (mean 18.4) suggest little growth through maturation and further substantiate the change effected by the programme as reported in 3
- 5) the high pre test scores suggest the entry behavior was too low. The validation testing was done in February after the students had been in a one year education programme for six months. Further evaluation should be done in September when a much less sophisticated entry behavior is to be expected.
- 6) comparison of mean pre test scores of groups 1 and 2 (17.0 and 17.1) suggest a consistent mean entry behavior for the two groups
- 7) the range in pre test and post test, and the mean scores for both pre test and post test for group 2 suggest that the pre test and post test are reasonably parallel and so comparisons have some validity
- 8) an analysis of the individual test items for both pre test and post test is necessary for group 1, so that sequences that do not encourage achievement of the desired objective can be modified in the programme

GROUP I PRETEST → PROGRAMME → POSTTEST

Student No.	Pretest (Raw Score)	Posttest (Raw Score)	Change	% Change
101	16	28	+12	41 %
102	21	29	+ 8	28 %
103	23	25	+ 2	7 %
104	16	21	+ 5	17 %
105	20	29	+ 9	31 %
106	29	29	-	-
107	18	27	+ 9	31 %
108	15	27	+12	41 %
109	13	24	+11	38 %
110	17	21	+ 4	14 %
111	16	25	+ 9	31 %
112	20	23	+ 3	10 %
113	20	27	+ 7	24 %
114	16	24	+ 8	28 %
115	17	20	+ 3	10 %
116	15	24	+ 9	31 %
117	16	23	+ 7	24 %
118	19	20	+ 1	3 %
119	14	28	+14	48 %
120	17	21	+ 4	14 %
121	12	25	+13	45 %
122	16	25	+ 9	31 %
123	19	27	+ 8	28 %
124	17	25	+ 8	28 %
126	9	20	+11	38 %
127	16	26	+10	34 %
128	17	22	+ 5	17 %
129	15	22	+ 7	24 %
Range	9-29	20-29	0-(+14)	
Mean	17.1	24.5	+7.8	+27%

TABLE II

GROUP 2 PRETEST → POST TEST

Student No.	Pretest (Raw Score)	Post test (Raw Score)	Change	% Change
201	22	21	-1	- 3%
202	15	19	+4	+14%
203	14	16	+2	7%
2-4	12	18	+6	21%
204	13	16	+3	10%
206	22	19	-3	-10%
207	19	18	-1	- 3%
208	17	19	+2	7%
209	15	18	+3	10%
210	22	21	-1	- 3%
211	16	18	+2	7%
212	21	16	-5	-17%
213	11	12	+1	3%
214	18	19	+1	3%
215	14	15	+1	3%
216	17	22	+5	+17%
217	16	19	+3	10%
218	18	23	+5	17%
219	18	19	+1	3%
220	18	18		
221	12	19	+7	24%
222	20	20		
223	13	16	+3	10%
224	15	20	+5	17%
225	19	17	-2	- 7%
226	19	20	+1	3%
227	20	19	-1	- 3%
228	20	20		
229	20	22	+2	7%
230	17	22	+3	7%
231	16	17	+1	3%
232	17	18	+1	3%
Range	11-22	12-23	(-5)-(+7)	
Mean	17.0	18.6	22	+4.8%

Student No.	Post test
301	19
302	18
303	15
304	22
305	14
306	19
307	22
308	20
309	19
310	18
311	20
312	18
313	17
314	20
315	18
316	16
317	18
Mean	18.4
Range	14-22